

REMARKS

The Examiner rejected claims 1-3, 17, 19 and 20 under 35 U.S.C. 102 as being anticipated by Motoda; Takashi et al. (U.S. Patent No. 5,496,408).

The Examiner rejected claims 4-7, 9, 10, 12 and 15 under 35 U.S.C. 103(a) as being unpatentable over Motoda; Takashi et al. (U.S. Patent No. 5,496,408) in view of Shinozuka; Shyuehi et al. (U.S. Patent No. 6,315,858).

The Examiner rejected claims 8, 11, 13, 14, 17 and 18 under 35 U.S.C. 103(a) as being unpatentable over Motoda; Takashi et al. (U.S. Patent No. 5,496,408) and Shinozuka; Shyuehi et al. (U.S. Patent No. 6,315,858) in view of Ohmi, Tadahiro et al. (U.S. Patent No. 5,313,982).

The arguments made by Applicant on appeal were rejected by the Board of Patent Appeals and Interferences. The board found that the claims as written were correctly interpreted by the examiner as not being limited to a flat plate fixed orifice and that the Examiner was correct in interpreting “fixed orifice” broadly to include the variable iris valve of Shinozuka.

Claims 1 and 18 have now been amended to make explicit that these claims are limited to a flat plate fixed orifice. Support for this amendment may be found in the originally filed claims, specifically claims 10-12.

A new declaration has been provided by Dean Larson that Applicant maintains overcomes the alleged defects of the prior declaration. In this declaration, Mr. Larson expressly states what his area of work is and the basis for his judgment as one of ordinary skill in the art. Mr. Larson also provides explicit description of features that are known to one of ordinary skill in the art to be a part of the definition of a flat plate fixed orifice.

Specifically, a flat plate fixed orifice is an orifice, having an immovable flat plate such that the size opening created by the flat plate is fixed at the time of manufacture and cannot be altered for the lifetime of the orifice. This clearly differentiates a flat plate fixed orifice from the iris valve of Shinozuka, which has an opening size that can be altered during operation. While the Examiner argues that placing the iris valve in a particular position and leaving it there constitutes “fixing” it, that is still not the same as a flat plate fixed orifice because the iris valve is not fixed at the time of manufacture and can clearly be altered during the lifetime of the

orifice. Furthermore, a flat plate fixed orifice contains no control mechanism, as it is not designed to move, and thus there is nothing to control. The iris valve in Shinozuka has a control mechanism.

These definitions also find support in the specification. For example, in FIG. 19, the opening 1916 defined by fixed plate 1908 appears permanently set, without control lines or any other mechanism to alter its size.

Furthermore, the permanently fixed nature of the opening of the orifice is implied on Page 27, lines 10-14, which states “[t]his embodiment is able to adjust the resistance and thus the flow through the slave leg by opening one or more of the first, second, third, fourth, or fifth flow valves 1836-1840 to provide flow through the first, second, third, fourth, or fifth fixed orifices 1841-1845, which provide difference resistances.” Thus, the resistance is only changed by altering a flow valve that is connected on the same line as a fixed orifice. That implies that the opening size of the fixed orifice itself cannot be changed, otherwise it would be much simpler for the opening size of the fixed orifice to be altered in order to change the resistance, rather than having to include a completely separate variable valve in the system to accomplish the same goal.

Thus, the iris valve of Shinozuka does not fit the technical definition of a fixed plate flat orifice and thus the Applicant respectfully requests that the rejection be withdrawn.

In addition to not fitting the technical definition of a fixed plate flat orifice, it would also not be obvious to one of ordinary skill in the art to combine the iris valve of Shinozuka with the apparatus of Motoda, as the Examiner alleges. Performing such a combination would not make sense to one of ordinary skill in the art.

First of all, such a hypothetical combination would result in there being two movable valves in the same leg (e.g., a master leg valve and the iris valve). Both of these valves would be performing the exact same function (growing or shrinking to allow or restrict air flow through the master leg valve). It would make no sense to have multiple components performing the same exact function, especially, as will be described, movable valves such as the iris valve introduce impurities and errors into the apparatus.

Second of all, the iris valve has several features that would introduce an unacceptable amount of error into the apparatus of Motoda. Specifically, the movable plates of the iris valve rub against each other, introducing particle contaminants that would damage the wafer substrate surface in a wafer dry etch process of small feature sizes. Similarly, an iris valve does not have a perfectly round aperture owing to the fact that the “plate” is actually several plates that have the ability to move to make the aperture larger or smaller, and also does not have a constant thickness at its aperture. Both of these aspects make the gas flow through the valve unpredictable, much different than a flat plate fixed orifice. Similarly, the movable nature of the iris valve introduces repeatability error, even at a particular same set point opening size. Independent claim 18 contains limitations similar to that as described above with respect to claim 1, and as such Applicant respectfully submits that this claim is in condition for allowance for the same reasons as claim 1.

Dependent claims 2-9, 13-17, and 19-20 are also patentably distinct from the cited references for at least the same reasons as those recited above for the independent claim, upon which they ultimately depend. These dependent claims recite additional limitations that further distinguish these dependent claims from the cited references. For example, claim 2 recites an additional slave leg having its own valve and fixed orifice. Having an iris valve on each of a master leg and two different slave legs makes no sense, as the additional control mechanisms required would add additional complexity without any additional benefit. For at least these reasons, claims 2-9, 13-17, and 19-20 are not anticipated or made obvious by the prior art outlined in the Office Action.

Applicants believe that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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